

Abstract

METHODS AND APPARATUS FOR ULTRASOUND VELOCITY MEASUREMENTS IN DRILLING FLUIDS

The disclosure relates to methods and apparatus for determining the velocity of an ultrasound pulse in drilling fluids in downhole environments. A method for determining a velocity of ultrasound propagation in a drilling fluid in a downhole environment includes emitting an ultrasound pulse into the drilling fluid in a borehole using a first ultrasound transducer (37); detecting the ultrasound pulse after the ultrasound pulse has traveled a distance (d); determining a travel time (t) required for the ultrasound pulse to travel the distance (d); and determining the velocity of ultrasound propagation from the known distance (d) and the travel time (t). An apparatus for determining a velocity of ultrasound propagation in a drilling fluid in a downhole environment includes a first ultrasound transducer (37) disposed on a tool; and a circuitry (82) for controlling a timing of an ultrasound pulse transmitted by the first ultrasound transducer (37) and for measuring a time lapse between ultrasound transmission and detection after the ultrasound pulse has traveled a distance (d).